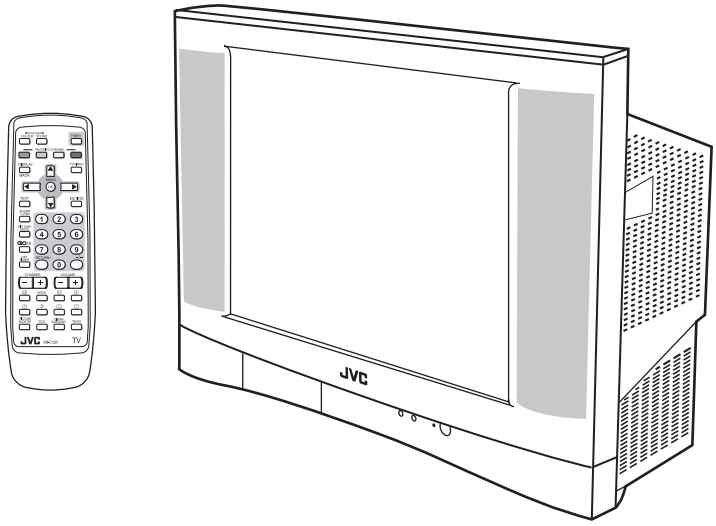
JVC

SERVICE MANUAL

FLAT COLOUR TELEVISION

AV-29V514/B

BASIC CHASSIS
CW



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No.YA139
2004/9

SPECIFICATION

Items		Contents
Dimensions (W × H × D)		81.2cm × 58.4cm × 52.0cm
Mass		41kg
TV RF System		B, G, I, D, K, M
Colour System	TV Mode Video Mode	PAL / SECAM / NTSC3.58 / NTSC4.43 PAL / SECAM / NTSC3.58 / NTSC4.43
Stereo System		A2 (B / G) / NICAM (B / G, I, D / K)
Receiving Frequency	VHF Low VHF High UHF CATV	46.25MHz ~ 168.25MHz (AU0 ~ S10) 175.25MHz ~ 463.25MHz (E5 ~ S41) 471.25MHz ~ 863.25MHz (E21 ~ CHINA 57) Mid : X ~ Z, S1 ~ S10 Super: S11 ~ S20 Hyper: S21 ~ S41
Intermediate Frequency	VIF	38.0MHz
	SIF	D/K: 31.5MHz (6.5MHz) [NICAM:32.15MHz (5.85MHz)] I: 32.0MHz (6.0MHz) [NICAM:31.45MHz (6.55MHz)] B/G: 32.5MHz (5.5MHz) [A2:32.26MHz (5.74MHz)] [NICAM:32.15MHz (5.85MHz)] M: 33.5MHz (4.5MHz)
Colour Sub Carrier Frequency		4.43MHz (PAL), 4.40MHz/4.25MHz (SECAM), 3.58MHz/4.43MHz (NTSC)
Aerial Input Terminal		75Ω unbalanced, coaxial
Power Input		AC110V-AC240V, 50Hz / 60Hz
Power Consumption		166W (Max.) / 109W (Avg.)
Picture Tube ⚠		A68LZU185X 29-inch, aspect ratio 4:3, flat square face type, tinted
Screen Size		Visible size :67.6cm (Diagonal) / 55.4cm × 41.4cm (H × V)
High Voltage		32kV -1.5kV / +1.0kV (at zero beam current)
Speaker		6.5cm × 13cm, Oval type × 2
Audio Output		10W + 10W
Video / Audio Input [1/2/3]	S-Video [1]	Mini-DIN 4 pin × 1 Y: 1V(p-p), positive (negative sync provided), 75Ω C: 0.286V(p-p) (Burst signal), 75Ω
	Video [1/2/3]	1V(p-p), negative sync, 75Ω, RCA pin jack × 3
	Audio [1/2/3]	500mV(rms) (-4dBs), high impedance, RCA pin jack × 6
	Component Video [2]	RCA pin jack × 3 Y:1V(p-p), positive (negative sync), 75Ω Cb/Cr:0.7V(p-p), 75Ω
Video / Audio Output	Video Audio	1V(p-p), 75Ω, RCA pin jack × 1 500mV(rms)(-4dBs), Low impedance (400Hz when modulated 100%), RCA pin jack × 2
Headphone		3.5mm stereo mini jack × 1
Remote Control Unit		RM-C1281-2H (AA/R06/UM-3 battery × 2)

Design & specifications are subject to change without notice.

SECTION 1
PRECAUTION

1.1 SAFETY PRECAUTIONS

(1) The design of this product contains special hardware, many circuits and components specially for safety purposes. For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.

(2) Alterations of the design or circuitry of the products should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.

(3) Many electrical and mechanical parts in the products have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the parts list of Service manual. **Electrical components having such features are identified by shading on the schematics and by (⚠) on the parts list in Service manual**. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list of Service manual may cause shock, fire, or other hazards.

(4) **Don't short between the LIVE side ground and ISOLATED (NEUTRAL) side ground or EARTH side ground when repairing.**
Some model's power circuit is partly different in the GND. The difference of the GND is shown by the LIVE : (⊥) side GND, the ISOLATED (NEUTRAL) : (⏚) side GND and EARTH : (⏚) side GND.
Don't short between the LIVE side GND and ISOLATED (NEUTRAL) side GND or EARTH side GND and never measure the LIVE side GND and ISOLATED (NEUTRAL) side GND or EARTH side GND at the same time with a measuring apparatus (oscilloscope etc.). If above note will not be kept, a fuse or any parts will be broken.

(5) If any repair has been made to the chassis, it is recommended that the B1 setting should be checked or adjusted (See B1 POWER SUPPLY check).

(6) The high voltage applied to the picture tube must conform with that specified in Service manual. Excessive high voltage can cause an increase in X-Ray emission, arcing and possible component damage, therefore operation under excessive high voltage conditions should be kept to a minimum, or should be prevented. If severe arcing occurs, remove the AC power immediately and determine the cause by visual inspection (incorrect installation, cracked or melted high voltage harness, poor soldering, etc.). To maintain the proper minimum level of soft X-Ray emission, components in the high voltage circuitry including the picture tube must be the exact replacements or alternatives approved by the manufacturer of the complete product.

(7) Do not check high voltage by drawing an arc. Use a high voltage meter or a high voltage probe with a VTVM. Discharge the picture tube before attempting meter connection, by connecting a clip lead to the ground frame and connecting the other end of the lead through a 10kΩ 2W resistor to the anode button.

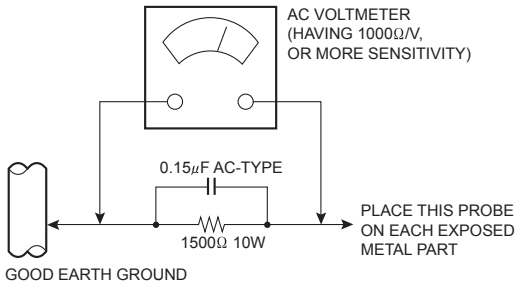
(8) When service is required, observe the original lead dress. Extra precaution should be given to assure correct lead dress in the high voltage circuit area. Where a short circuit has occurred, those components that indicate evidence of overheating should be replaced. Always use the manufacturer's replacement components.

(9) **Isolation Check (Safety for Electrical Shock Hazard)**
After re-assembling the product, always perform an isolation check on the exposed metal parts of the cabinet (antenna terminals, video/audio input and output terminals, Control knobs, metal cabinet, screw heads, earphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.

a) **Dielectric Strength Test**
The isolation between the AC primary circuit and all metal parts exposed to the user, particularly any exposed metal part having a return path to the chassis should withstand a voltage of 3000V AC (r.m.s.) for a period of one second. (. . . Withstand a voltage of 1100V AC (r.m.s.) to an appliance rated up to 120V, and 3000V AC (r.m.s.) to an appliance rated 200V or more, for a period of one second.)
This method of test requires a test equipment not generally found in the service trade.

b) **Leakage Current Check**
Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground (water pipe, etc.). Any leakage current must not exceed 0.5mA AC (r.m.s.).
However, in tropical area, this must not exceed 0.2mA AC (r.m.s.).

Alternate Check Method
Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Use an AC voltmeter having 1000Ω per volt or more sensitivity in the following manner. Connect a 1500Ω 10W resistor paralleled by a 0.15μF AC-type capacitor between an exposed metal part and a known good earth ground (water pipe, etc.). Measure the AC voltage across the resistor with the AC voltmeter. Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.75V AC (r.m.s.). This corresponds to 0.5mA AC (r.m.s.).
However, in tropical area, this must not exceed 0.3V AC (r.m.s.). This corresponds to 0.2mA AC (r.m.s.).



SECTION 2
SPECIFIC SERVICE INSTRUCTIONS

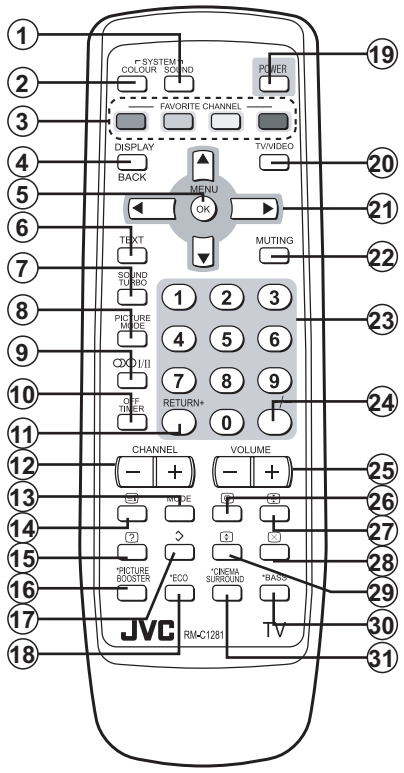
2.1 FEATURES

- New chassis design enables use of an interactive on-screen control.
- Pure flat CRT produces fine textured picture in every detail.
- Wide range voltage (110V ~ 240V) for AC power input.
- With AUDIO/VIDEO/S-VIDEO/COMPONENT input terminals.
- I^2C bus control utilizes single chip ICs.
- By means of AUTO PROGRAM, the TV stations can be selected automatically and the TV channels can also be rearranged automatically.
- Built-in DIGITAL ECO MODE (ECONOMY, ECOLOGY).
  In accordance with the brightness in a room, the brightness and/or contrast of the picture can be adjusted automatically to make the optimum picture which is easy on the eye.
- Built-in OFF TIMER & RETURN +.

2.2 FUNCTIONS

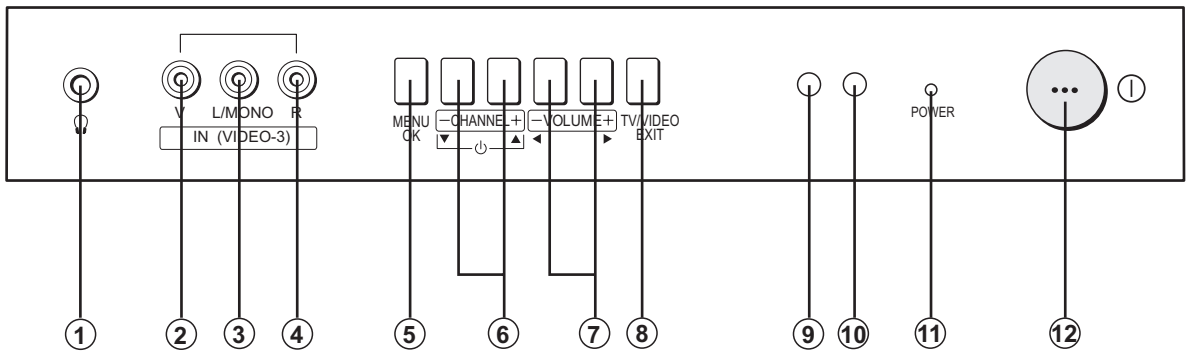
■ REMOTE CONTROL UNIT

RM-C1281-2H



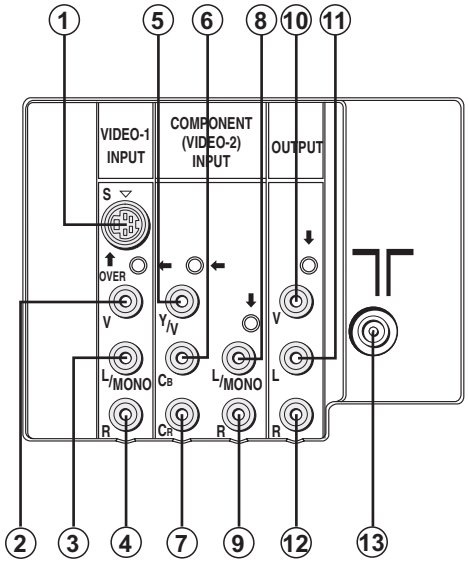
1	SOUND SYSTEM key	17	Not used
2	COLOUR SYSTEM key	18	ECO key
3	FAVORITE CHANNEL keys	19	POWER key
4	DISPLAY BACK key	20	TV / VIDEO key
5	MENU (OK) key	21	MENU (▲/▼, ◀/▶) keys
6	Not used	22	MUTING key
7	SOUND TURBO key	23	Number keys
8	PICTURE MODE key	24	-/-- key
9	SOUND setting key	25	VOLUME (-/+) keys
10	OFF TIMER key	26	Not used
11	RETURN + key	27	Not used
12	CHANNEL (-/+) keys	28	Not used
13	Not used	29	Not used
14	Not used	30	Not used
15	Not used	31	CINEMA SURROUND key
16	Not used		

■ FRONT PANEL CONTROLS



①	HEADPHONE jack
②	IN (VIDEO-3) : VIDEO
③	IN (VIDEO-3) : AUDIO L/MONO
④	IN (VIDEO-3) : AUDIO R
⑤	MENU (OK) button
⑥	CHANNEL (-/+) buttons
⑦	VOLUME (-/+) buttons
⑧	TV/VIDEO EXIT buttons
⑨	Remote control sensor
⑩	ECO sensor
⑪	POWER lamp
⑫	MAIN POWER button

■ REAR TERMINAL



VIDEO-1 INPUT TERMINAL

①	S-VIDEO
②	VIDEO
③	AUDIO L/MONO
④	AUDIO R

COMPONENT (VIDEO-2) INPUT TERMINAL

⑤	Y/VIDEO
⑥	C_B
⑦	C_R
⑧	AUDIO L/MONO
⑨	AUDIO R

OUTPUT TERMINAL

⑩	VIDEO
⑪	AUDIO L
⑫	AUDIO R

⑬	Aerial input terminal

2.3 MAIN CPU [MAIN PWB : IC701] PIN FUNCTION

Pin no.	Pin name	I/O	Remark
1	VssP2	-	GND
2	VssC4	-	GND
3	V1.8C4	I	1.8V (Digital)
4	V3.3A3	I	3.3V
5	VrefP_Sdac	I	3.3V (Positive)
6	VrefN_Sdac	-	GND
7	VrefP_Sdac	I	3.3V (Negative)
8	VrefN_Sdac	-	GND
9	VrefP_Sdac	I	3.3V (Positive)
10	XtalIn	I	24.567MHz for system clock
11	XtalOut	O	24.567MHz for system clock
12	VssA1	-	GND
13	NECK	I	V-guard input/ I/O switch
14	CONT	I	1.8V regulator control
15	V5P1	I	+5V
16	Ph2	-	Phase-2 filter
17	Ph1	-	Phase-1 filter
18	Gnd1	-	GND
19	SecPll	-	SECAM PLL decoupling
20	Dec8G	-	Bandgap decoupling
21	EW	O	East-West drive output
22	VDRB-	O	Vertical drive B output
23	VDRA+	O	Vertical drive A output
24	Vif1	I	Video IF input 1
25	Vif2	I	Video IF input 2
26	Vsc	-	Vertical sawtooth capacitor
27	Iref	I	Reference current input
28	GndIF	-	GND
29	Sif1	I	Sound IF input 1
30	Sif2	I	Sound IF input 2
31	AGC	O	Tuner AGC output
32	EHT	I	EHT/overvoltage protection input
33	Ssif/RefIn/Avl/RefOut	O	Automatic Volume Levelling/ sound IF input / subcarrier reference output / external reference signal input for I signal mixer for DVB operation
34	L3	I	Audio-L3 input (left signal)
35	R3	I	Audio-R3 input (right signal)
36	L_OUT	O	Audio L output
37	R_OUT	O	Audio R output
38	DecsDem	-	Decoupling sound demodulator
39	QssO/AmO/AudeEm	O	QSS intercarrier output / AM output / deemphasis / (front-end audio out)
40	Gnd2	-	GND
41	PllIf	-	IF-PLL loop filter
42	SifAgc	-	AGC sound IF
43	IfVo/FmRo/DvbO	O	Not used
44	NC	O	Not used
45	V8AudioSwitches	I	8V
46	AgcSsif	-	AGC capacitor second sound IF
47	V5P2	I	5V
48	V_OUT	O	Video output
49	L1	I	Audio-L1 input
50	R1	I	Audio-R1 input
51	V3	I	Video V3 input
52	C4	I	Not used
53	Audio2InL	I	Not used
54	Audio2InR	I	Not used
55	V2/Y	I	Video 2 input
56	L2	I	Audio L2 input (Left signal)
57	R2	I	Audio R2 input (right signal)
58	Y3/Cvbs	I	S-Video Y1 input
59	C1	I	S-Video C1 input
60	AudioLsL	O	Audio L output for audio power amplifier
61	AudioLsR	O	Audio R output for audio power amplifier
62	HP_L	O	Headphone L
63	HP_R	O	Headphone R

Pin no.	Pin name	I/O	Remark
64	CVBSO/PIP	O	CVBS / PIP output
65	SVM	O	Scan velocity modulation output
66	FbiSo	I	Flyback input/sandcastle output
67	Hout	O	Horizontal output
68	VssComb	-	GND
69	V5Comb	I	5V
70	Vin/R2/Pr	I	PIP R input
71	Uin/B2/Pb	I	PIP B input
72	Yin/G2/Y	I	PIP G input
73	Ysync	I	Not used
74	Yout	O	Not used
75	Uout/INSSW2	I	YUV insertion input
76	NC	O	Not used
77	INSSW3	I	YUV insertion input
78	R3/Pr	I	Component PR input (Video-2)
79	G3/Y	I	Component Y input (Video-2)
80	B3/Pb	I	Component PB input (Video-2)
81	Gnd3	-	GND
82	V5P3	I	5V
83	BCL	I	Beam current limiter input
84	BLKIN	I	Black current input
85	Rout	O	R output
86	Gout	O	G output
87	Bout	O	B output
88	V3.3A1	I	3.3V
89	RefAdN	-	GND
90	V3.3RefAdP	I	3.3V (Positive)
91	RefAd	I	3.3/2V
92	GndA	-	GND
93	V1.8A	I	1.8V
94	V3.3A2	I	3.3V
95	VssADC	-	GND
96	V1.8ADC	I	1.8V
97	REMOTE	I	Remote control
98	PW_LED	I	POWER LED control
99	P11/TO	I	POWER LED control
100	V1.8C2	I	1.8V
101	VssC2	-	GND
102	COMPONENT-PIP	-	Not used
103	COMB_SW_NT3.5/OTHER	-	Not used
104	VER_PROTECT	O	X-ray protect
105	S_REDUCE	O	Sound control
106	P00/I2SDI1	O	Not used
107	POWER	O	SUB POWER control
108	SCL1	I	I2C bus clock
109	SDA1	I/O	I2C bus clock
110	V3.3P	I	3.3V
111	ROTATION	O	ROTATION
112	3.58/OTHER	O	NTSC 3.58 detection
113	A_MUTE	O	Audio muting
114	4.5/OTHER	O	NTSC 4.43 detection
115	PROT	I	Protect
116	ECO_IN	I	ECO sensor level detection
117	V1.8C1	I	1.8V (Digital)
118	DecV1V8	I	1.8V
119	KEY_IN	I	Key scan data
120	VDO_DET	I	Video DET input
121	VSSC1+P1	-	Digital GND
122	P24/PWM3	I	S-Video DET input
123	P25/PWM4	O	GTVA_reset
124	V1.8C3	I	1.8V (Digital)
125	VssC3	-	GND
126	P12/Int2	I	External interrupt
127	SDA0	I/O	I2C bus data (for memory)
128	SCL0	I	I2C bus clock (for memory)

SECTION 3
DISASSEMBLY

3.1 DISASSEMBLY PROCEDURE

3.1.1 REMOVING THE REAR COVER

- Unplug the power cord.
  (1) Remove the 16 screws **[A]** as shown in Fig.1.
  (2) Withdraw the REAR COVER toward you.

CAUTION:

When reinstalling the rear cover, carefully push it inward after inserting the MAIN PWB into the REAR COVER groove.

3.1.2 REMOVING THE CHASSIS (CHASSIS BASE AND CONTROL BASE)

- Remove the REAR COVER.
  (1) Slightly raise the both sides of the CHASSIS by hand and remove the 2 claws **[B]** under the CHASSIS from the front cabinet as shown in Fig.1.
  (2) Withdraw the CHASSIS backward.
  (If necessary, take off the wire clamp, connectors etc.)

NOTE:

When conducting a check with power supplied, be sure to confirm that the CRT earth wire is connected to the CRT SOCKET PWB and the MAIN PWB.

3.1.3 REMOVING THE AV TERMINAL BOARD

- Remove the REAR COVER.
  (1) Remove the 4 screws **[C]** as shown in Fig.1.
  (2) When you pull out the AV TERMINAL BOARD in the direction of arrow **[D]** as shown in Fig.1, it can be removed.

3.1.4 REMOVING THE CONTROL BASE

- Remove the REAR COVER.
- Remove the CHASSIS.
  (1) While pushing down the 2 claws **[E]** as shown in Fig. 2 and pull out the CONTROL BASE in the direction of arrow **[F]** as shown in Fig. 2, the control base can be removed.
  (If necessary, take off the wire, connectors etc.)

3.1.5 REMOVING THE SPEAKER

- Remove the REAR COVER.
  (1) Remove the 2 screws **[G]** as shown in Fig.1.
  (2) Withdraw the SPEAKER backward.
  (3) Follow the same steps when removing the other hand SPEAKER.

3.1.6 CHECKING THE MAIN PW BOARD

- To check the back side of the MAIN PWB.
  (1) Pull out the CHASSIS and CONTROL BASE. (Refer to the procedure described in REMOVING THE CHASSIS)
  (2) Put the CHASSIS in upright position with the MAIN PWB's solderside faced to the right. The FBT must be positioned on top. (Viewed from the rear)
  (3) Put the CONTROL PWBs in an appropriate position, taking care not giving tension to the ribbon cables that connect to the MAIN PWB.

CAUTIONS:

- Use insulating materials, if necessary, to avoid possible electrical contacts between PWBs and expose terminals, etc.
- Before turning on power, make sure that the CRT earth wire and other connectors are properly connected.
- When repairing, connect the DEG. COIL to the DEG. connector on the MAIN PWB.

3.1.7 WIRE CLAMPING AND CABLE TYING

(1) Be sure to clamp the wire.
(2) Never remove the cable tie used for tying the wires together.
Should it be inadvertently removed, be sure to tie the wires with a new cable tie.

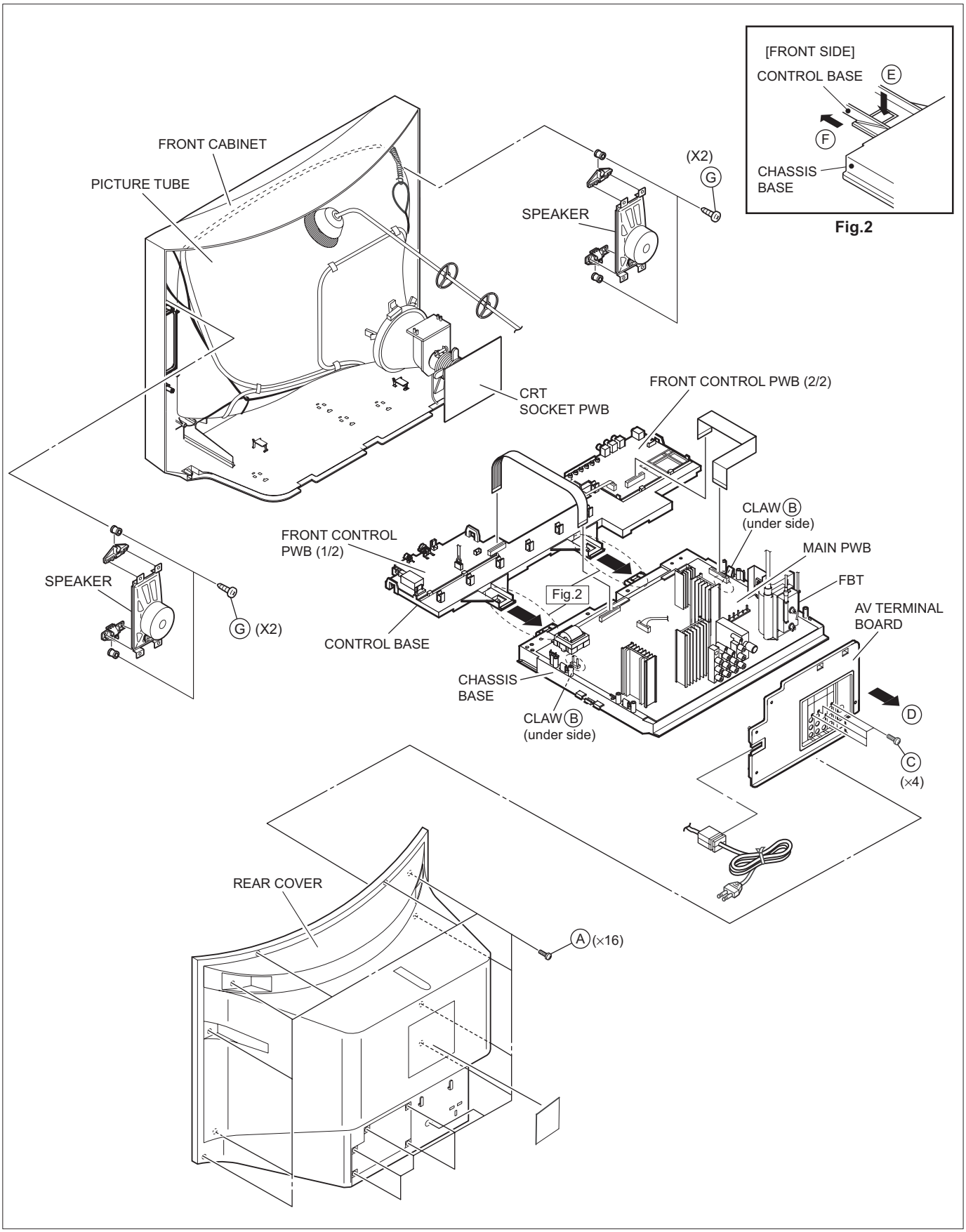

[FRONT SIDE]
CONTROL BASE
E
F
CHASSIS BASE
Fig.2
FRONT CABINET
PICTURE TUBE
(X2)
G
SPEAKER
CRT SOCKET PWB
FRONT CONTROL PWB (2/2)
CLAW B (under side)
MAIN PWB
FRONT CONTROL PWB (1/2)
FBT
Fig.2
AV TERMINAL BOARD
SPEAKER
G (X2)
CONTROL BASE
CHASSIS BASE
CLAW B (under side)
D
C (×4)
REAR COVER
A (×16)

Fig.1

3.2 REPLACEMENT OF MEMORY IC

3.2.1 MEMORY IC

This TV uses the following memory IC.

Memory IC: IC702 on MAIN PWB

The memory IC memorizes data for correctly operating the video and deflection circuits. When replacing the memory IC, be sure to use the same type IC written with the initial values of data. In other words, use the specific IC listed in "PRINTED WIRING BOARD PARTS LIST". For its mounting location, refer to "ADJUSTMENT LOCATIONS".

3.2.2 PROCEDURE FOR REPLACING MEMORY IC

1. Power off

Switch the power off and unplug the power cord from the wall outlet.

2. Replacing the memory IC

Replace the memory IC with new one. Be sure to use the memory IC written with the initial data values.

3. Power on

Plug the power cord into the wall outlet and switch the power on.

4. Check and setting of SYSTEM CONSTANT SET:

(1) Press the [DISPLAY] key and the [PICTURE MODE] key on the remote control unit simultaneously.
The SERVICE MENU screen will be displayed.(See Fig.1.)

(2) In the SERVICE MENU, press the [DISPLAY] key and [PICTURE MODE] key simultaneously. Then, the SYSTEM CONSTANT SET screen will be displayed.(See Fig.2.)

(3) Check whether the setting values of the SYSTEM CONSTANT SET are the same as those indicated in Table 1.
If the value is different, select the setting item with the MENU [▲] / [▼] key, and set the correct value with the MENU [◀] / [▶] key.

(4) Press the [DISPLAY] key twice to return to the normal screen.

5. Receive channel setting

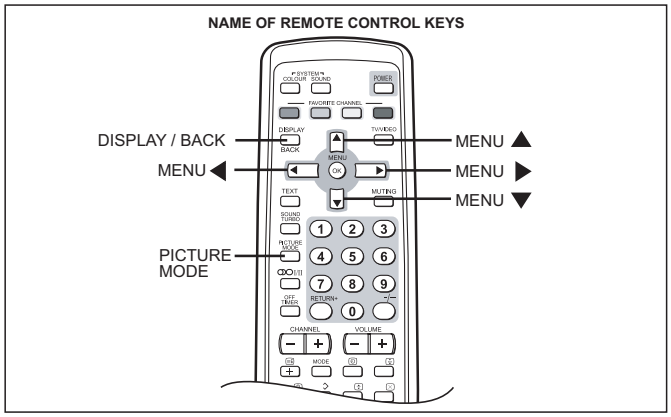
Refer to the **OPERATING INSTRUCTIONS** and set the receive channels (channels preset).

6. User setting

Check the user setting values in Table 2 and Table 3. If setting value is different, set the correct value.
For setting, refer to the **OPERATING INSTRUCTIONS**.

7. Setting of SERVICE MENU

Verify the setting for each setting item in the SERVICE MENU.(See Table 4.) If readjustment is necessary, perform adjustment referring to "ADJUSTMENTS PROCEDURE".



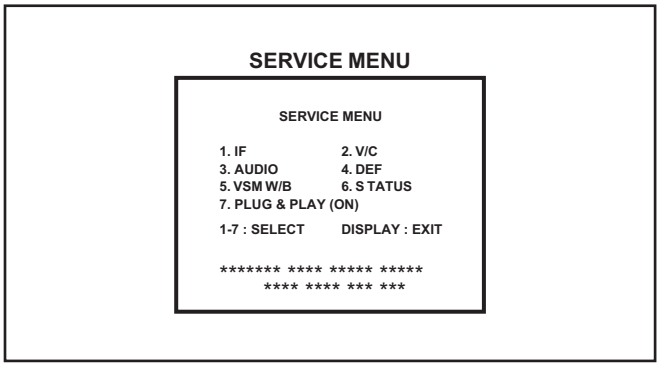


Fig.1

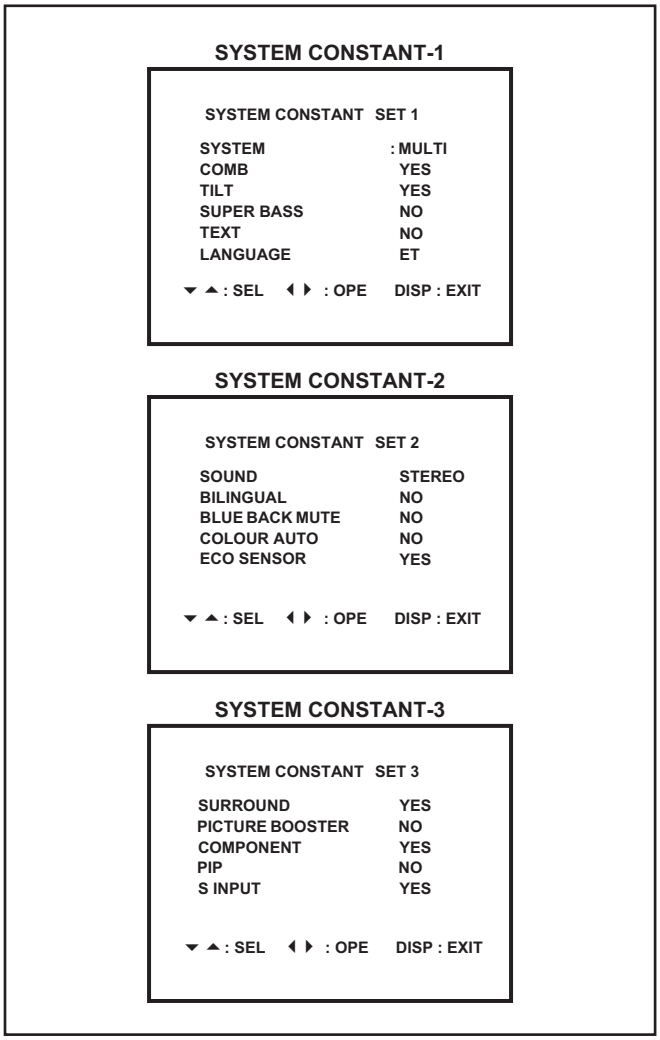


Fig.2

3.2.3 FACTORY SETTING VALUE

■ **SETTING OF SYSTEM CONSTANT SET**

Setting item	Setting content	Setting value
SYSTEM	MULTI↔TRIPLE↔PAL↔THAI	MULTI
COMB	YES ↔ NO	YES
TILT	YES ↔ NO	YES
SUPER BASS	YES ↔ NO	NO
TEXT	SINGLE ↔ NO ↔ PAT	NO
LANGUAGE	E/T	E/T
SOUND	STEREO ↔ PB ↔ MONO	STEREO
BILINGUAL	YES ↔ NO	NO
BLUE BACK MUTE	YES ↔ NO	NO
COLOUR AUTO	YES ↔ NO	NO
ECO SENSOR	YES ↔ NO	YES
SURROUND	YES ↔ NO	YES
PICTURE BOOSTER	YES ↔ NO	NO
COMPONENT	YES ↔ NO	YES
PIP	YES ↔ NO	NO
S INPUT	YES ↔ NO	YES

Table 1

■ **SETTING OF BASIC FUNCTIONS**

Setting item	Setting value
POWER	Off
SUB POWER	On
VOLUME	15
COLOR SYSTEM	PAL
SOUND SYSTEM	B/G
PICTURE MODE (VSM)	BRIGHT
CINEMA SURROUND	OFF
OFF TIMER	OFF
STEREO MODE	STEREO
CHANNEL POSITION	PR1

Table 2

■ **SETTING OF MENU SCREEN**

Setting item	Setting value
INPUT	TV
VNR	AUTO
COMPRESS (16:9)	OFF
PICTURE TILT	◆
AUTO SHUTOFF	OFF
CHILD LOCK	OFF
BLUE BACK	ON
VIDEO-2 SET	VIDEO
AUTO PROGRAM	Refer to OPERATING INSTRUCTIONS
EDIT / MANUAL	Refer to OPERATING INSTRUCTIONS
LANGUAGE	THAI
TINT	Centre
COLOUR	Centre
BRIGHT	Centre
CONT	Maximum
SHARP	Centre
BALANCE	Centre
SOUND MODE	DYNAMIC
SOUND TURBO	OFF
AI VOLUME	ON
FAVORITE CH RED	PR01
FAVORITE CH GREEN	PR02
FAVORITE CH YELLOW	PR03
FAVORITE CH BLUE	PR04
AI ECO SENSOR	OFF
AI ECO DISPLAY	ON

Table 3

■ **SERVICE MENU SETTING ITEMS**

Setting item	Setting value
1. IF	1. VCO 2. DELAY POINT
2. V/C	1. SCREEN 2. CUTOFF(B/G) 3. WDR(R/G/B) 4. BRIGHT(TV/VDO 1/2/3) 5. CONT(TV/VDO 1/2/3/TV 16:9/VDO 16:9) 6. COLOUR(TV/VDO1/2/3/DVD) 7. TINT(TV/VDO 1/2/3) 8. SHARP [Do not adjust] 9. Y DELAY [Do not adjust] 10. TINT DVD [Do not adjust] 11. AMP T. SHARP
3. AUDIO **[Do not adjust]**	1. DCXO ADJ 2. NICAM lower ERRLIM 3. NICAM upper ERRLIM 4. A2 ID THR 5. MENU EQUALIZER
4. DEF	1. V-SHIFT 2. V-SLOPE 3. V-SIZE 4. H-CENT 5. H-SIZE 6. TRAPEZ 7. EW-PIN 8. COR-UP 9. COR-LO 10. ANGLE 11. BOW 12. V-S.CR 13. V-LIN 14. V-ZOOM 15. V-SCROLL
5. VSM W/B **(BRIGHT/STANDARD/SOFT)** **(COOL/WARM/NORMAL)**	1. BRIGHT 2. CONT 3. COLOUR 4. SHARP 5. HUE 1. R DRIVE 2. G DRIVE 3. B DRIVE
6. STATUS **[Display only]**	
7. PLUG & PLAY(ON) **[Display only]**	

Table 4

3.3 REPLACEMENT OF CHIP COMPONENT

3.3.1 CAUTIONS

(1) Avoid heating for more than 3 seconds.
(2) Do not rub the electrodes and the resist parts of the pattern.
(3) When removing a chip part, melt the solder adequately.
(4) Do not reuse a chip part after removing it.

3.3.2 SOLDERING IRON

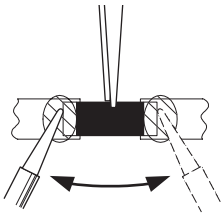
(1) Use a high insulation soldering iron with a thin pointed end of it.
(2) A 30w soldering iron is recommended for easily removing parts.

3.3.3 REPLACEMENT STEPS

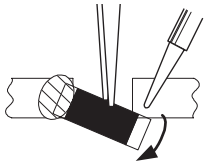
1. How to remove Chip parts

[Resistors, capacitors, etc.]

(1) As shown in the figure, push the part with tweezers and alternately melt the solder at each end.



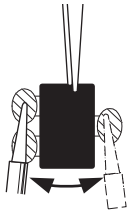
(2) Shift with the tweezers and remove the chip part.



[Transistors, diodes, variable resistors, etc.]

(1) Apply extra solder to each lead.

(2) As shown in the figure, push the part with tweezers and alternately melt the solder at each lead. Shift and remove the chip part.



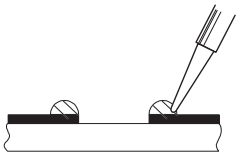
NOTE :

After removing the part, remove remaining solder from the pattern.

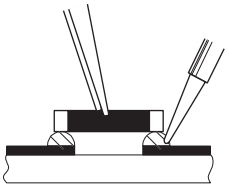
2. How to install Chip parts

[Resistors, capacitors, etc.]

(1) Apply solder to the pattern as indicated in the figure.

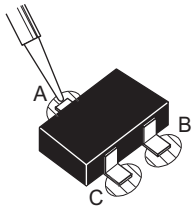


(2) Grasp the chip part with tweezers and place it on the solder. Then heat and melt the solder at both ends of the chip part.

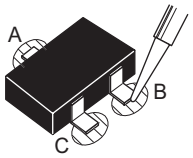


[Transistors, diodes, variable resistors, etc.]

(1) Apply solder to the pattern as indicated in the figure.
(2) Grasp the chip part with tweezers and place it on the solder.
(3) First solder lead **A** as indicated in the figure.



(4) Then solder leads **B** and **C**.



SECTION 4
ADJUSTMENT

4.1 ADJUSTMENT PREPARATION

(1) **You can make the necessary adjustments for this unit with either the remote control unit or with the adjustment equipment and parts as given below.**
(2) **Adjustment with the remote control unit is made on the basis of the initial setting values, however, the new setting values used for setting the screen to its optimum condition may differ from the initial settings.**
(3) Make sure that AC power is turned on correctly.
(4) Turn on the power for the set and test equipment before use, and start the adjustment procedures after waiting at least 30 minutes.
(5) Unless otherwise specified, prepare the most suitable reception or input signal for adjustment.
(6) Never touch any adjustment parts, which are not specified in the list for this variable resistors, transformers, trimmer capacitors, etc.

4.2 PRESETTING BEFORE ADJUSTMENT

Unless otherwise specified in the adjustment instructions, preset the following functions with the remote control unit.

■ **User mode setting position**

Setting item	Setting value
PICTURE MODE (VSM)	BRIGHT
TINT, COLOUR, BRIGHT,SHARP	Centre
CONT	Maximum
VNR	OFF
AI ECO SENSOR	OFF
BALANCE	Centre
SOUND TURBO	OFF
CINEMA SURROUND	OFF
COMPRESS	4:3

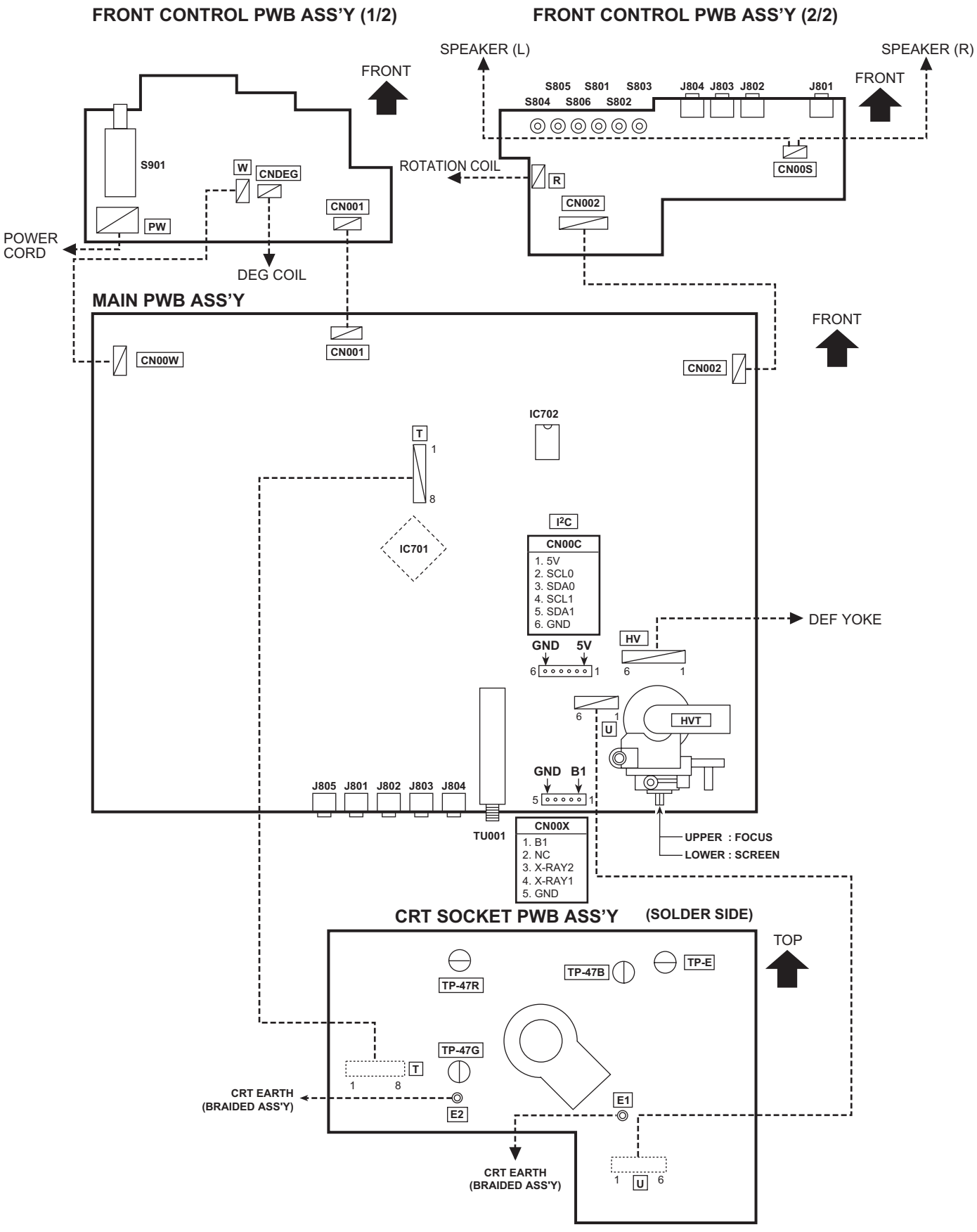
4.3 MEASURING INSTRUMENT AND FIXTURES

(1) DC voltmeter (or Digital voltmeter)
(2) Oscilloscope
(3) Signal generator (Pattern generator) [PAL/SECAM/NTSC]
(4) Remote control unit

4.4 ADJUSTMENT ITEMS

■ B1 VOLTAGE
■ FOCUS ADJUSTMENT
■ IF CIRCUIT ADJUSTMENTS
• IF VCO adjustment
• DELAY POINT (AGC TAKE-OVER) adjustment
■ VIDEO CIRCUIT ADJUSTMENTS
• WHITE BALANCE (Low light) adjustment
• WHITE BALANCE (High light) adjustment
• SUB BRIGHT adjustment
• SUB CONTRAST adjustment
• SUB COLOUR 1 adjustment
• SUB COLOUR 2 adjustment
• SUB TINT 1 adjustment
• SUB TINT 2 adjustment
■ AUDIO SETTING
■ DEFLECTION CIRCUIT ADJUSTMENTS
• V.SLOPE adjustment
• V.POSITION adjustment
• V.HEIGHT adjustment
• H.POSITION adjustment
• H. WIDTH adjustment
• SIDE PIN adjustment
• TRAPEZIUM adjustment
• V.S-CURVE adjustment
• CORNER adjustment
• H. PARALLEL adjustment
• H.BOW adjustment
■ VSM PRESET SETTING
■ PURITY AND CONVERGENCE ADJUSTMENTS
• PURITY adjustment
• STATIC CONVERGENCE adjustment
• DYNAMIC CONVERGENCE adjustment

4.5 ADJUSTMENT LOCATIONS



4.6 BASIC OPERATION IN SERVICE MENU

Operate the SERVICE MENU with the remote control unit.

4.6.1 SERVICE MENU ITEMS

With the SERVICE MENU, various settings (adjustments) can be made, and they are broadly classified in the following items of settings:

1. IF	For entering/adjusting the setting values (adjustment values) of the IF circuit.
2. V/C	For entering/adjusting the setting values (adjustment values) of the VIDEO circuit.
3. AUDIO	For entering/adjusting the setting values (adjustment values) of the AUDIO circuit.
4. DEF	For entering/adjusting the setting values (adjustment values) of the DEFLECTION circuit.
5. VSM W/B	For setting the values of STANDARD, SOFT, BRIGHT and COOL, NORMAL, WARM.
6. STATUS	This is not used for service.
7. PLUG & PLAY (ON)	This is not used for service.

4.6.2 BASIC OPERATION IN SERVICE MENU

1. HOW TO ENTER SERVICE MENU

Press the [DISPLAY] key and the [PICTURE MODE] key on the remote control unit simultaneously.
The SERVICE MENU screen will be displayed. (See Fig. 1 on the next page.)

2. SELECTION OF SUB MENU SCREEN

Press one of the keys 1 to 6 on the remote control unit, and select the SUB MENU SCREEN from the SERVICE MENU. (See Fig.1 on the next page.)
SERVICE MENU → SUB MENU

1. IF
2. V/C
3. AUDIO
4. DEF
5. VSM W/B
6. STATUS
7. PLUG & PLAY (ON)

3. METHOD OF SETTING

NOTES:

- Once the setting values are set, they are memorized automatically.
- It must not be adjusted without inputting a signal.

(1) 1. IF

[1.VCO] : Under normal conditions, no adjustment is required.

(a) [1] key	Select **1. IF**.
(b) [1] key	Select **1. VCO**.
(c) [DISPLAY] key	When this is pressed twice, you will return to the SERVICE MENU.

[2.DELAY POINT]

(a) [1] key	Select **1. IF**.
(b) [2] key	Select **2. DELAY POINT**.
(c) MENU [◀] / [▶] key	Adjust the setting value.
(d) [DISPLAY] key	When this is pressed twice, you will return to the SERVICE MENU.

(2) 2. V/C, 3. AUDIO and 4. DEF

(a) [2] ~[4] keys	Select one from **2. V/C**, **3. AUDIO** and **4. DEF**
(b) MENU [▲] / [▼] key	Select setting items.
(c) MENU [◀] / [▶] key	Adjust the setting values of the setting items. Use the number keys on the remote control unit for setting the WHITE BALANCE. For the setting, refer to each item concerned.
(d) [DISPLAY] key	When this is pressed, you will return to the SERVICE MENU.

(3) 5. VSM W/B

(a) [5] keys	Select **5. VSM W/B**.
(b) MENU [OK] key	Select preset items.
(c) MENU [▲] / [▼] key	Adjust setting items.
(d) MENU [◀] / [▶] key	Adjust the setting values of the setting items.
(e) [DISPLAY] key	When this is pressed, you will return to the SERVICE MENU.

(4) 6. STATUS

This is for display only.

(5) 7. PLUG & PLAY (ON)

This is not used for service.

4. Release of SERVICE MENU

After completing the setting, return to the SERVICE MENU by pressing the [DISPLAY] key, then again press the [DISPLAY] key to return to the normal screen.

4.6.3 SERVICE MENU FLOW CHART

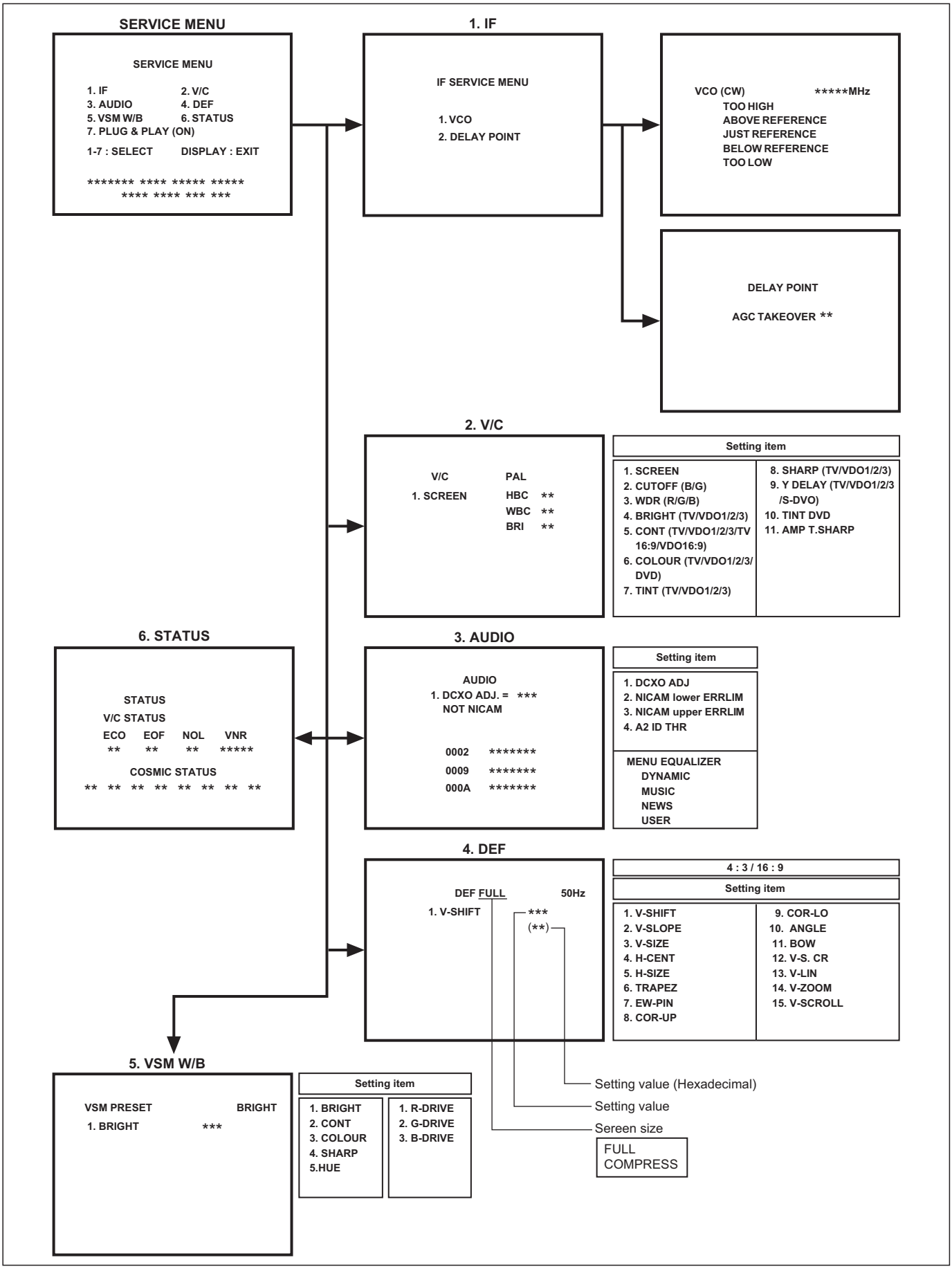


Fig.1

4.7 ADJUSTMENT PROCEDURE

4.7.1 B1 VOLTAGE

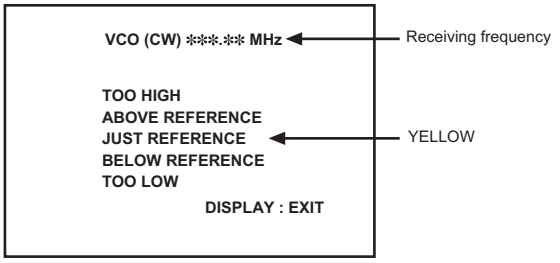
Item	Measuring instrument	Test point	Adjustment part	Description
B1 VOLTAGE check	Signal generator DC voltmeter	B1 (pin 1) GND (pin 5) [CN00X connector in MAIN PWB]		(1) Receive a black and white signal. (2) Connect a DC voltmeter between B1 and GND (between pins 1 and 5 of the connector CN00X). (3) Make sure that the voltage is **DC134.5V ± 2V**.

4.7.2 FOCUS ADJUSTMENT

Item	Measuring instrument	Test point	Adjustment part	Description
FOCUS adjustment	Signal generator		FOCUS VR [In HVT]	**Notes:** • Set PICTURE MODE (VSM) to "BRIGHT". • The final adjustment of CONVERGENCE must be done after the FOCUS adjustment. (CONVERGENCE is affected by the FOCUS adjustment.) If any aeviation in CONVERGENCE is found, PURITY must be adjusted to restore the convergence. (1) Receive a crosshatch signal. (2) Adjust the **FOCUS VR** so that the vertical and horizontal lines will be clear and in fine detail on the screen. (3) Make sure that the picture is in focus even when the screen gets darkened.

4.7.3 IF CIRCUIT ADJUSTMENTS

Item	Measuring instrument	Test point	Adjustment part	Description
IF VCO check	Remote control unit		[1. IF] 1. VCO (CW)	**Note:** • Under normal conditions, no adjustment is required. (1) Receive a broadcast signal. (2) Select **1. IF** from the SERVICE MENU. (3) Select **1. VCO**. (4) Check the characters colour of the **JUST REFERENCE** displayed to **yellow**. (5) Press the [DISPLAY] key three times to return to normal screen.



Item	Measuring instrument	Test point	Adjustment part	Description
DELAY POINT (AGC TAKE-OVER) adjustment	Remote control unit		[1. IF] 2. DELAY POINT	(1) Receive a black and white broadcast signal (colour off). (2) Select **1. IF** from the SERVICE MENU. (3) Select **2. DELAY POINT**. (4) Adjust in order to eliminate any noise or beat from the image. Any increase above the initial value produces the noise and any decrease below it produces the beat. (5) Press the [DISPLAY] key three times to return to the normal screen. (6) Turn to other channels and make sure that there are no irregularities.

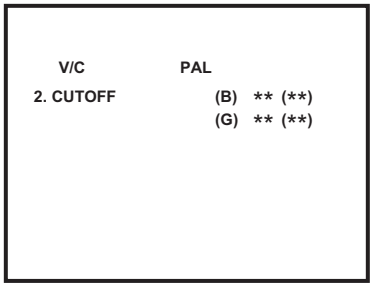
Adjustment item	Initial setting value			
	NTSC 3.58		OTHERS	
	VHF	UHF	VHF	UHF
2. DELAY POINT (AGC TAKE-OVER)	35	35	35	35

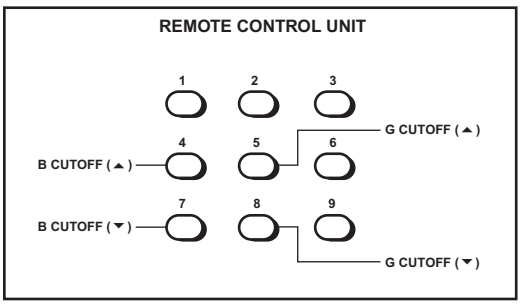
4.7.4 VIDEO CIRCUIT ADJUSTMENTS

- The setting (adjustment) using the remote control unit is made on the basis of the initial setting values.
- The setting values which adjust the screen to the optimum condition can be different from the initial setting values.
- Do not change the initial setting values of the setting (adjustment) items not listed in "ADJUSTMENT PROCEDURE".
- The initial setting values in parenthesis ( ) are fixed offset values, needing no further adjustment.

Adjustment item		Variable range	Initial setting value					
			PAL	SECAM	NTSC3.58	NTSC4.43	COMPONENT (V-2)	
							525i	625i
1. SCREEN	BRI	0 ~ 63	32	32	32	32	32	32
2. CUTOFF	B	0 ~ 63 (-32 ~ +31)	11	11	11	11	(-3)	(-3)
	G	0 ~ 63 (-32 ~ +31)	7	7	7	7	(-5)	(-5)
3. WDR	R	0 ~ 63 (-32 ~ +31)	32	32	32	32	(0)	(0)
	G	0 ~ 63 (-32 ~ +31)	32	32	32	32	(0)	(0)
	B	0 ~ 63 (-32 ~ +31)	45	45	45	45	(0)	(0)
4. BRIGHT	RF	0 ~ 63 (-32 ~ +31)	39	39	39	39	---	---
	VIDEO 1(COMPOSITE/S)	(-32 ~ +31)	(-1)	(-1)	(-1)	(-1)	---	---
	VIDEO 2(COMPONENT)	(-32 ~ +31)	(0)	(0)	(0)	(0)	(0)	(0)
	VIDEO 3(COMPOSITE)	(-32 ~ +31)	(0)	(0)	(0)	(0)	---	---
5. CONT.	RF	0 ~ 63	32	32	32	32	---	---
	VIDEO	(-32 ~ +31)	(+2)	(+2)	(+2)	(+2)	(+2)	(+2)
	RF 16:9	(-32 ~ +31)	(0)	(0)	(0)	(0)	---	---
	VIDEO 16:9	(-32 ~ +31)	---	---	---	---	---	---
6. COLOUR	RF	0 ~ 63 (-32 ~ +31)	42	32	37	(-3)	---	---
	VIDEO	(-32 ~ +31)	(-1)	(0)	(-4)	(0)	(+4)	(-5)
7. TINT	RF	0 ~ 63 (-32 ~ +31)	---	---	27	(-4)	---	---
	VIDEO	(-32 ~ +31)	---	---	(0)	(+11)	---	---
8. SHARP	RF	0 ~ 63	22	22	22	22	---	---
	VIDEO	0 ~ 63	35	35	35	35	15	15
9. Y DELAY	RF	0 ~ 15	9	7	12	7	---	---
	VIDEO	0 ~ 15	7	7	7	7	---	---
	S-VIDEO	0 ~ 15	9	10	11	11	---	---
10. TINT DVD	VIDEO, S-VIDEO	0 ~ 63	34	32	32	32	---	---
	COMPONENT	(-32 ~ +31)	---	---	---	---	(-2)	(-2)
11. AMP T.SHARP	RF, VIDEO	0 ~ 63	0	0	0	0	0	0

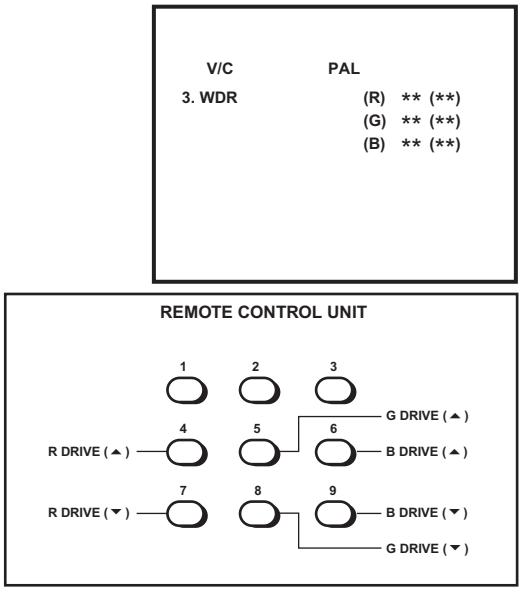
Item	Measuring instrument	Test point	Adjustment part	Description
WHITE BALANCE (Low light) adjustment	Signal generator Remote control unit		[2. V/C] 2. CUTOFF (B) 2. CUTOFF (G) SCREEN VR [In HVT]	**Note:** • Set PICTURE MODE (VSM) to "BRIGHT". **- COMPOSITE WHITE BALANCE -** (1) Receive a PAL black and white signal (colour off). (2) Select **2. V/C** from the SERVICE MENU. (3) Select **2. CUTOFF (B)** and **(G)**. (4) Set each value to initial setting value with the **[4]** / **[7]** keys and **[5]** / **[8]** keys. (5) Turn the **SCREEN VR** fully counterclockwise, then slowly turn it clockwise to where a red, blue or green colour is faintly visible. (6) Use the **[4]** / **[7]** and **[5]** / **[8]** keys to adjust so that the other 2 colours appear white. (7) Turn the **SCREEN VR** to where the single horizontal line glows faintly. (8) Press the [DISPLAY] key twice to return to the normal screen. **- COMPONENT WHITE BALANCE -** (1) Receive a PAL component black and white signal (colour off). (2) Select VIDEO-2 SET from the MENU and set VIDEO-2 SET to COMPONENT. (3) Adjust COMPONENT WHITE BALANCE in the same way as "COMPOSITE WHITE BALANCE".





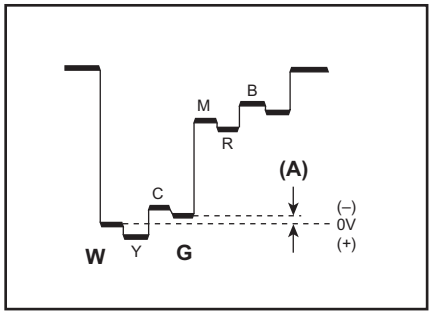
Adjustment Item		Variable range	Initial setting value	
			COMPOSITE	COMPONENT
2. CUT OFF	B	0 ~ 63(-32~+31)	11	(-3)
	G	0 ~ 63(-32~+31)	7	(-5)

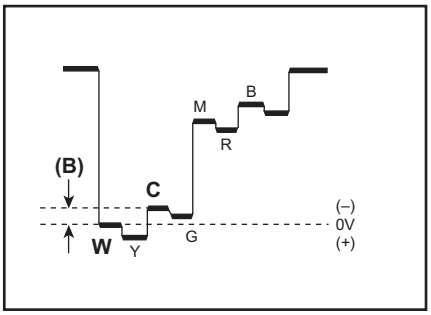
<table>
<tr><th>Item</th><th>Measuring instrument</th><th>Test point</th><th>Adjustment part</th><th>Description</th></tr>
<tr><td>WHITE BALANCE (High light) adjustment</td><td>Signal generator

Remote control unit</td><td></td><td>[2. V/C]
3. WDR (R)
3. WDR (G)
3. WDR (B)</td><td rowspan="2">Notes:
• Proceed to the following adjustment after having completed the WHITE BALANCE (Low light) adjustment.
• Set PICTURE MODE (VSM) to "BRIGHT".
(1) Receive a PAL black and white signal (colour off).
(2) Select 2. V/C from the SERVICE MENU.
(3) Select 3. WDR (R), (G) and (B).
(4) Set each value to initial setting value with the [4] to [9] keys.
(5) Use the [4] to [9] keys to produce a white screen.
(6) Press the [DISPLAY] key twice to return to the normal screen.
<table><tr><th colspan="2">Adjustment Item</th><th>Variable range</th><th>Initial setting value</th></tr><tr><td rowspan="3">3. WDR</td><td>R</td><td>0 ~ 63</td><td>32</td></tr><tr><td>G</td><td>0 ~ 63</td><td>32</td></tr><tr><td>B</td><td>0 ~ 63</td><td>45</td></tr></table></td></tr>
<tr><td colspan="4"> 
</td></tr>
<tr><td>SUB BRIGHT adjustment</td><td>Remote control unit</td><td></td><td>[2. V/C]
4. BRIGHT</td><td>Notes:
• Proceed to the following adjustment after having completed the WHITE BALANCE (Low light) and WHITE BALANCE (High light) adjustment.
• Set PICTURE MODE (VSM) to "BRIGHT".
(1) Receive a broadcast.
(2) Select 2. V/C from the SERVICE MENU.
(3) Select 4. BRIGHT.
(4) Set the initial setting value.
(5) If the brightness is not best with the initial setting value, make fine adjustment until you get the best brightness.
(6) Press the [DISPLAY] key twice to return to the normal screen.</td></tr>
<tr><td>SUB CONTRAST adjustment</td><td>Remote control unit</td><td></td><td>[2. V/C]
5. CONT</td><td>Notes:
• Proceed to the following adjustment after having completed the SUB BRIGHT adjustment.
• Set PICTURE MODE (VSM) to "BRIGHT".
(1) Receive a broadcast.
(2) Select 2. V/C from the SERVICE MENU.
(3) Select 5. CONT.
(4) Set the initial setting value.
(5) If the contrast is not best with the initial setting value, make fine adjustment until you get the best contrast.
(6) Press the [DISPLAY] key twice to return to the normal screen.</td></tr>
</table>

<table>
<tr><th>Item</th><th>Measuring instrument</th><th>Test point</th><th>Adjustment part</th><th>Description</th></tr>
<tr><td>SUB COLOUR 1 adjustment</td><td>Remote control unit</td><td></td><td>[2. V/C]
6. COLOUR</td><td>[Method of adjustment without measuring instrument]
Notes:
• Proceed to the following adjustment after having completed the SUB CONTRAST adjustment.
• Set PICTURE MODE (VSM) to "BRIGHT".
- PAL COLOUR -
(1) Receive a PAL broadcast.
(2) Select 2. V/C from the SERVICE MENU.
(3) Select 6. COLOUR.
(4) Set the initial setting value for PAL COLOUR.
(5) If the colour is not best with the initial setting value, adjust until you get the best colour.
(6) Press the [DISPLAY] key twice to return to the normal screen.
- SECAM COLOUR -
(1) Receive a SECAM broadcast.
(2) Press the [COLOUR SYSTEM] key to select the SECAM colour system.
(3) Adjust SECAM COLOUR in the same way as for "PAL COLOUR".
- NTSC 3.58 COLOUR -
(1) Receive a NTSC 3.58MHz broadcast.
(2) Press the [COLOUR SYSTEM] key to select the NTSC 3.58 colour system.
(3) Adjust NTSC 3.58 COLOUR in the same way as for "PAL COLOUR".
- NTSC 4.43 COLOUR -
When adjustment is done for NTSC 3.58 COLOUR, appropriate values are automatically set for NTSC 4.43 COLOUR.</td></tr>
<tr><td>SUB COLOUR 2 adjustment</td><td>Signal generator

Oscilloscope

Remote control unit</td><td>TP-47G
TP-E
[CRT SOCKET PWB]</td><td>[2. V/C]
6. COLOUR</td><td rowspan="2">[Method of adjustment using measuring instrument]
Notes:
• Proceed to the following adjustment after having completed the SUB CONTRAST adjustment.
• Set PICTURE MODE (VSM) to "BRIGHT".
- PAL COLOUR -
(1) Receive a PAL colour bar signal (full field colour bar 75% white).
(2) Select 2. V/C from the SERVICE MENU.
(3) Select 6. COLOUR.
(4) Set the initial setting value of PAL COLOUR.
(5) Connect the oscilloscope between TP-47G and TP-E.
(6) Adjust PAL COLOUR to set the value (A) in the figure to +18V.
- SECAM COLOUR -
(1) Receive a SECAM colour bar signal (colour bar 75% white).
(2) Press the [COLOUR SYSTEM] key to select the SECAM colour system.
(3) Set the initial setting value of SECAM COLOUR.
(4) Adjust SECAM COLOUR to set the value (A) in the figure to +7V.
- NTSC 3.58 COLOUR -
(1) Receive a NTSC 3.58 colour bar signal (full field colour bar 75% white).
(2) Press the [COLOUR SYSTEM] key to select the NTSC 3.58 colour system.
(3) Set the initial setting value of NTSC 3.58 COLOUR.
(4) Adjust NTSC 3.58 COLOUR to set the value (A) in the figure to +9V.
- NTSC 4.43 COLOUR -
When adjustment is done for NTSC 3.58 COLOUR, appropriate values are automatically set for NTSC 4.43 COLOUR.</td></tr>
<tr><td colspan="4"> 
</td></tr>
</table>

Item	Measuring instrument	Test point	Adjustment part	Description
SUB TINT 1 adjustment	Signal generator Remote control unit		[2. V/C] 7. TINT	**[Method of adjustment without measuring instrument]** **Notes:** • Proceed to the following adjustment after having completed the SUB CONTRAST adjustment. • Set PICTURE MODE (VSM) to "BRIGHT". **- NTSC 3.58 TINT -** (1) Receive a NTSC 3.58 colour bar signal (full field colour bar 75% white). (2) Press the [COLOUR SYSTEM] key to select the NTSC 3.58 colour system. (3) Select **2. V/C** from the SERVICE MENU. (4) Select **7. TINT**. (5) Set the initial setting value of NTSC 3.58. (6) If you cannot get the best tint with the initial setting value, make fine adjustment until you get the best tint. (7) Press the [DISPLAY] key twice to return to the normal screen. **- NTSC 4.43 TINT -** When adjustment is done for NTSC 3.58 TINT, appropriate values are automatically set for NTSC 4.43 TINT.
SUB TINT 2 adjustment	Signal generator Oscilloscope Remote control unit	TP-47G TP-E [CRT SOCKET PWB]	[2. V/C] 7. TINT	**[Method of adjustment using measuring instrument]** **Notes:** • Proceed to the following adjustment after having completed the SUB CONTRAST adjustment. • Set PICTURE MODE (VSM) to "BRIGHT". **- NTSC 3.58 TINT -** (1) Receive a NTSC 3.58 colour bar signal (full field colour bar 75% white). (2) Press the [COLOUR SYSTEM] key to select the NTSC 3.58 colour system. (3) Select **2. V/C** from the SERVICE MENU. (4) Select **7. TINT**. (5) Set the initial setting value of NTSC 3.58. (6) Connect the oscilloscope between TP-47G and TP-E. (7) Adjust NTSC 3.58 TINT to set the value **(B)** in the figure to **+8V**. (8) Press the [DISPLAY] key twice to return to the normal screen. **- NTSC 4.43 TINT -** When adjustment is done for NTSC 3.58 TINT, appropriate values are automatically set for NTSC 4.43 TINT.
				

4.7.5 AUDIO SETTING

This submenu is for display only, no adjustment is required.

Function	Item	Setting value				
AUDIO	1. DC XO ADJ	F0H				
	2. NICAM LOWER ERR LIM	6FH				
	3. NICAM UPPER ERR LIM	B0H				
	4. A2 ID THR	00H				
Function	**Item**	**100Hz**	**300Hz**	**1kHz**	**3kHz**	**8kHz**
MENU EQUALIZER	DYNAMIC	+4	+3	-10	+3	+4
	MUSIC	+7	+2	+5	+2	+7
	NEWS	-6	+1	+6	+1	-6
	USER	0	0	0	0	0

4.7.6 DEFLECTION CIRCUIT ADJUSTMENTS

- The setting (adjustment) using the remote control unit is made on the basis of the initial setting values.
- The setting values which adjust the screen to the optimum condition can be different from the initial setting values.
- When performing deflection circuit adjustment, adjusts PAL signal (fv: 50 Hz) in 4:3 mode and 16:9 mode respectively, and adjust the NTSC signal (fv: 60 Hz) similarly.

Note:

Proceed to the following adjustment after having completed the adjustments of SUB BRIGHT and SUB PICTURE.

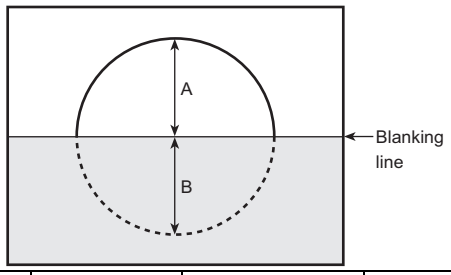
■ **4. DEF**

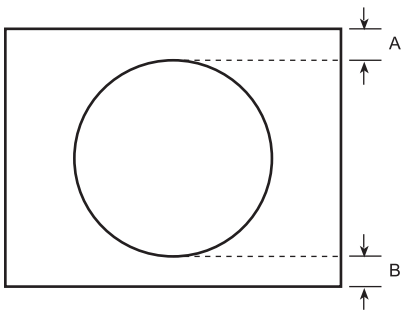
Adjustment item	Variable range		Initial setting value			
	4:3 50Hz	Others	4:3		COMPRESS (16:9)	
			50Hz	60Hz	50Hz	60Hz
1. V-SHIFT	0 ~ 63	-32 ~ +31	0*	0*	0*	0*
2. V-SLOPE	0 ~ 63	-32 ~ +31	0*	0*	0*	0*
3. V-SIZE	0 ~ 63	-32 ~ +31	+15*	0*	-4*	-2*
4. H-CENT	0 ~ 63	-32 ~ +31	+35*	0*	0*	0*
5. H-SIZE	0 ~ 63	-32 ~ +31	+45*	0*	0*	0*
6. TRAPEZ	0 ~ 63	-32 ~ +31	0*	0*	0*	0*
7. EW-PIN	0 ~ 63	-32 ~ +31	-12*	0*	0*	0*
8. COR-UP	0 ~ 63	-32 ~ +31	0*	0*	0*	0*
9. COR-LO	0 ~ 63	-32 ~ +31	0*	0*	0*	0*
10. ANGLE	0 ~ 63	-32 ~ +31	0*	0*	0*	0*
11. BOW	0 ~ 63	-32 ~ +31	0*	0*	0*	0*
12. V-S.CR	0 ~ 63	-32 ~ +31	0*	0*	0*	0*
13. V-LIN	0 ~ 63	-32 ~ +31	0*	0*	0*	0*
14. V-ZOOM	0 ~ 63	-32 ~ +31	(+25)	0	-23*	+3*
15. V-SCROLL	0 ~ 63	-32 ~ +31	(+32)	(0)	(0)	(0)

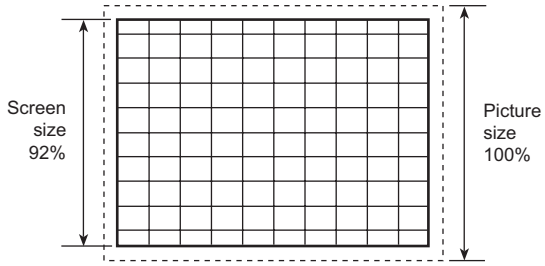
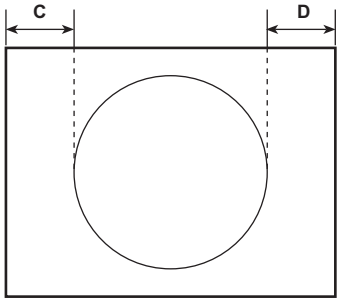
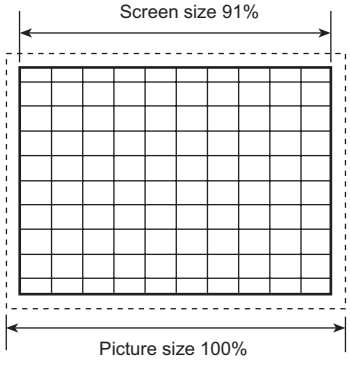
NOTE: The value with an asterisk * is variable for adjustment. The values in parenthesis ( ) are fixed values.

■ **COMPRESS: OFF (4:3)**

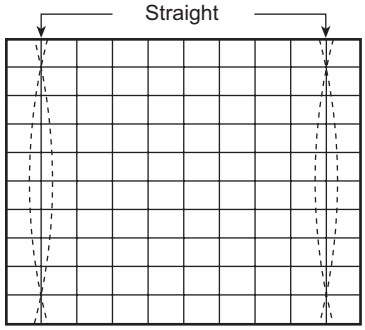
<table>
<tr><th>Item</th><th>Measuring instrument</th><th>Test point</th><th>Adjustment part</th><th>Description</th></tr>
<tr><td>V. SLOPE adjustment</td><td>Signal generator

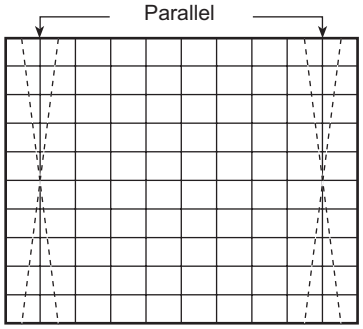
Remote control unit</td><td></td><td>[4. DEF]
2. V-SLOPE</td><td rowspan="2">- PAL V. SLOPE -
(1) Receive a PAL circle pattern signal of vertical frequency 50Hz.
(2) Select 4. DEF from the SERVICE MENU.
(3) Select 2. V-SLOPE.
(4) Set the initial setting value of 2. V-SLOPE.
(5) Adjust 2. V-SLOPE to make "A = B".
(6) Press the [DISPLAY] key twice to return to SERVICE MENU screen.
- NTSC V. SLOPE -
(1) Receive a NTSC circle pattern signal of vertical frequency 60Hz.
(2) Make similar adjustment of NTSC V-SLOPE in the same way as for "PAL V-SLOPE".</td></tr>
<tr><td colspan="4"> 
</td></tr>
<tr><td>V. POSITION adjustment</td><td>Signal generator

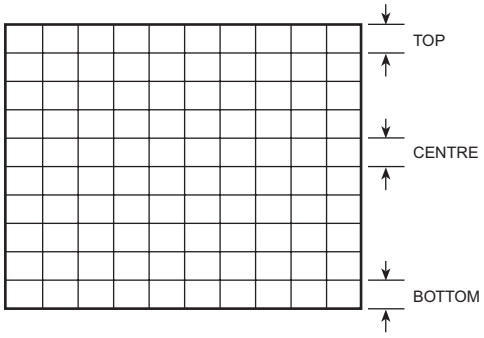
Remote control unit</td><td></td><td>[4. DEF]
1. V-SHIFT</td><td rowspan="2">- PAL V. POSITION -
(1) Receive a PAL circle pattern signal of vertical frequency 50Hz.
(2) Select 1. V-SHIFT.
(3) Set the initial setting value of 1. V-SHIFT.
(4) Adjust 1. V-SHIFT to make "A = B".
- NTSC V. POSITION -
(1) Receive a NTSC circle pattern signal of vertical frequency 60Hz.
(2) Make similar adjustment of NTSC V. POSITION in the same way as for "PAL V. POSITION".</td></tr>
<tr><td colspan="4"> 
</td></tr>
</table>

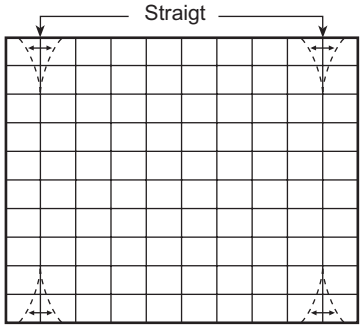
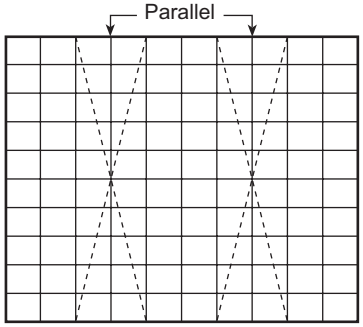
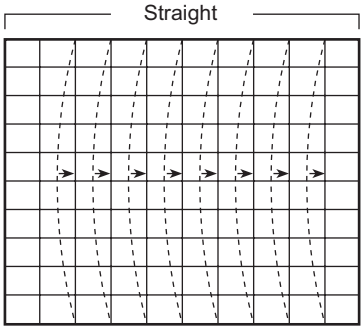
Item	Measuring instrument	Test point	Adjustment part	Description
V. HEIGHT adjustment	Signal generator Remote control unit		[4. DEF] 3. V-SIZE 14. V-ZOOM	**- PAL V. HEIGHT -** (1) Receive a PAL crosshatch signal. (2) Select **3. V-SIZE**. (3) Set the initial setting value of **3. V-SIZE**. (4) Select **14. V-ZOOM**. (5) Set the initial setting value of **14. V-ZOOM**. (6) Adjust **14. V-ZOOM** to make the vertical screen size to 92% of the picture size. **- NTSC V. HEIGHT -** (1) Receive a NTSC crosshatch signal. (2) Make similar adjustment of NTSC V. HEIGHT in the same way as for "PAL V. HEIGHT".
				
H. POSITION adjustment	Signal generator Remote control unit		[4. DEF] 4. H-CENT	**- PAL H. POSITION -** (1) Receive a PAL circle pattern signal. (2) Select **4. H-CENT**. (3) Set the initial setting value of **4. H-CENT**. (4) Adjust **4. H-CENT** to make "**C = D**". **- NTSC H. POSITION -** (1) Receive a NTSC circle pattern signal. (2) Make similar adjustment of NTSC H. POSITION in the same way as for "PAL H. POSITION".
				
H. WIDTH adjustment	Signal generator Remote control unit		[4.DEF] 5. H-SIZE	**- PAL H. WIDTH -** (1) Receive a PAL crosshatch signal. (2) Select **5. H-SIZE**. (3) Set the initial setting value of **5. H-SIZE**. (4) Adjust **5. H-SIZE** to make the horizontal screen size to 91% of the picture size. **- NTSC H. WIDTH -** (1) Receive a NTSC crosshatch signal. (2) Make similar adjustment of NTSC H. WIDTH in the same way as for "PAL H. WIDTH".
				

<table>
<tr><th>Item</th><th>Measuring instrument</th><th>Test point</th><th>Adjustment part</th><th>Description</th></tr>
<tr><td>SIDE PIN adjustment</td><td>Signal generator

Remote control unit</td><td></td><td>[4. DEF]
7. EW-PIN</td><td rowspan="2">- PAL SIDE PIN -
(1) Receive a PAL crosshatch signal.
(2) Select 7. EW-PIN.
(3) Set the initial setting value of 7. EW-PIN.
(4) Adjust 7. EW-PIN so that the first vertical lines at the left and right edges on the screen are straight.
- NTSC SIDE PIN -
(1) Receive a NTSC crosshatch signal.
(2) Make similar adjustment of NTSC SIDE PIN in the same way as for "PAL SIDE PIN".</td></tr>
<tr><td colspan="4"> 
</td></tr>
<tr><td>TRAPEZIUM adjustment</td><td>Signal generator

Remote control unit</td><td></td><td>[4.DEF]
6. TRAPEZ</td><td rowspan="2">- PAL TRAPEZIUM -
(1) Receive a PAL crosshatch signal.
(2) Select 6. TRAPEZ.
(3) Set the initial setting value of 6. TRAPEZ.
(4) Adjust 6. TRAPEZ so that the vertical lines at the left and right edges on the screen are in parallel.
- NTSC TRAPEZIUM -
(1) Receive a NTSC crosshatch signal.
(2) Make similar adjustment of NTSC TRAPEZIUM in the same way as for "PAL TRAPEZIUM".</td></tr>
<tr><td colspan="4"> 
</td></tr>
<tr><td>V.LINEARITY adjustment</td><td>Signal generator

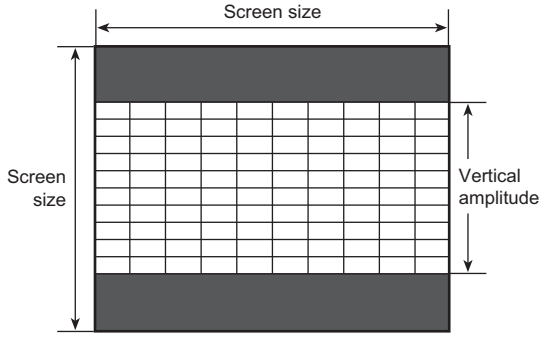
Remote control unit</td><td></td><td>[4. DEF]
12. V-S. CR
13. V-LIN</td><td rowspan="2">- PAL V. LINEARITY -
(1) Receive a PAL crosshatch signal.
(2) Select 12. V-S.CR.
(3) Set the initial setting value of 12. V-S. CR.
(4) Select 13. V-LIN.
(5) Set the initial setting value of 13. V-LIN.
(6) Adjust 12. V-S. CR and 13. V-LIN so that the spaces of each line on TOP, CENTRE and BOTTOM become uniform.
- NTSC V. LINEARITY -
(1) Receive a NTSC crosshatch signal.
(2) Make similar adjustment of NTSC V-S. CR in the same way as for "PAL V-S. CR".</td></tr>
<tr><td colspan="4"> 
</td></tr>
</table>

Item	Measuring instrument	Test point	Adjustment part	Description
CORNER PIN adjustment	Signal generator Remote control unit		[4. DEF] 8. COR-UP 9. COR-LO	**- PAL CORNER PIN -** (1) Receive a PAL crosshatch signal. (2) Select **8. COR-UP**. (3) Set the initial setting value of **8. COR-UP**. (4) Select **9. COR-LO**. (5) Set the initial setting value of **9. COR-LO**. (6) Adjust **8. COR-UP** and **9. COR-LO** so that the vertical lines at the four corners on the screen are straight. **- NTSC CORNER PIN -** (1) Receive a NTSC crosshatch signal. (2) Make similar adjustment of NTSC CORNER in the same way as for "PAL CORNER".
				
H. PARALLEL adjustment	Signal generator Remote control unit		[4.DEF] 10. ANGLE	**- PAL H. PARALLEL -** (1) Receive a PAL crosshatch signal. (2) Select **10. ANGLE**. (3) Set the initial setting value of **10. ANGLE**. (4) Adjust **10. ANGLE** to optimize the trapezium distortion at the centre of the screen. **- NTSC H. PARALLEL -** (1) Receive a NTSC crosshatch signal. (2) Make similar adjustment of NTSC H. PARALLEL in the same way as for "PAL H. PARALLEL".
				
H. BOW adjustment	Signal generator Remote control unit		[4.DEF] 11. BOW	**- PAL H. BOW -** (1) Receive a PAL crosshatch signal. (2) Select **11. BOW**. (3) Set the initial setting value of **11. BOW**. (4) Adjust **11. BOW** to optimize the horizontal arc distortion. **- NTSC H. BOW -** (1) Receive a NTSC crosshatch signal. (2) Make similar adjustment of NTSC H. BOW in the same way as for "PAL H. BOW". (3) Press the [DISPLAY] key twice to return to the normal screen.
				

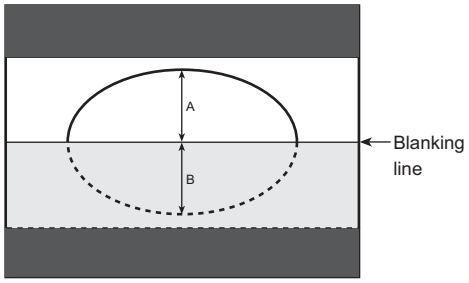
■ **COMPRESS : ON (16:9)**

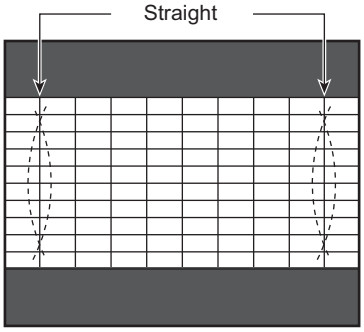
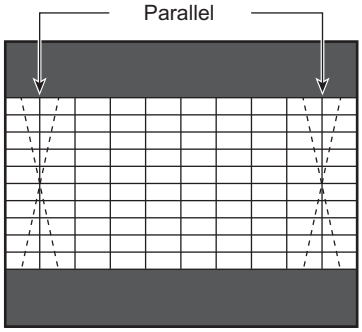
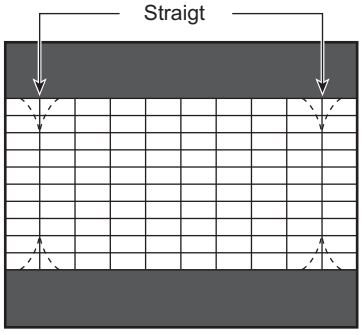
<table>
<tr><th>Item</th><th>Measuring instrument</th><th>Test point</th><th>Adjustment part</th><th>Description</th></tr>
<tr><td>V. HEIGHT adjustment</td><td>Signal generator

Remote control unit</td><td></td><td>[4.DEF]
14. V. ZOOM
3. V-SIZE</td><td rowspan="2">- PAL V. HEIGHT -
(1) Receive a PAL crosshatch signal of vertical frequency 50Hz.
(2) Press the [MENU] key and select PICTURE.
(3) Select PICTURE FEATURES.
(4) Select COMPRESS (16 : 9) and set COMPRESS to ON.
(5) Select 4. DEF from the SERVICE MENU.
(6) Set the initial setting value of 14. V. ZOOM.
(7) Select 3. V-SIZE.
(8) Set the initial setting value of 3. V-SIZE.
(9) Adjust 3. V-SIZE to set the vertical amplitude of the image to 305mm.

- NTSC V. HEIGHT -
(1) Receive a NTSC crosshatch signal of vertical frequency 60Hz.
(2) Make similar adjustment of NTSC V. HEIGHT in the same way as for "PAL V. HEIGHT".</td></tr>
<tr><td colspan="4"> 
</td></tr>
<tr><td>V. SLOPE adjustment</td><td>Signal generator

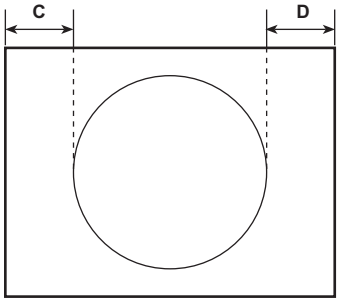
Remote control unit</td><td></td><td>[4.DEF]
2. V-SLOPE</td><td rowspan="2">- PAL V. SLOPE -
(1) Receive a PAL circle pattern signal of vertical frequency 50Hz.
(2) Select 4. DEF from the SERVICE MENU.
(3) Select 2. V-SLOPE.
(4) Set the initial setting value of 2. V-SLOPE.
(5) Adjust 2. V-SLOPE to make "A = B".
(6) Press the [DISPLAY] key to return to SERVICE MENU screen.

- NTSC V. SLOPE -
(1) Receive a NTSC circle pattern signal of vertical frequency 60Hz.
(2) Make similar adjustment of NTSC V-SLOPE in the same way as for "PAL V-SLOPE".</td></tr>
<tr><td colspan="4"> 
</td></tr>
</table>

Item	Measuring instrument	Test point	Adjustment part	Description
SIDE PIN adjustment	Signal generator Remote control unit		[4. DEF] 7. EW-PIN	**- PAL SIDE PIN -** (1) Receive a PAL crosshatch signal. (2) Select **7. EW-PIN**. (3) Set the initial setting value of **7. EW-PIN**. (4) Adjust **7. EW-PIN** so that the first vertical lines at the left and right edges on the screen are straight. **- NTSC SIDE PIN -** (1) Receive a NTSC crosshatch signal. (2) Make similar adjustment of NTSC SIDE PIN in the same way as for "PAL SIDE PIN".
				
TRAPEZIUM adjustment	Signal generator Remote control unit		[4. DEF] 6. TRAPEZ	**- PAL TRAPEZIUM PIN -** (1) Receive a PAL crosshatch signal. (2) Select **6. TRAPEZ**. (3) Set the initial setting value of **6. TRAPEZ**. (4) Adjust **6. TRAPEZ** so that the vertical lines at the left and right edges on the screen are in parallel. **- NTSC TRAPEZIUM PIN -** (1) Receive a NTSC crosshatch signal. (2) Make similar adjustment of NTSC TRAPEZIUM in the same way as for "PAL TRAPEZIUM".
				
CORNER PIN adjustment	Signal generator Remote control unit		[4. DEF] 8. COR-UP 9. COR-LO	**- PAL CORNER PIN -** (1) Receive a PAL crosshatch signal. (2) Select **8. COR-UP**. (3) Set the initial setting value of **8. COR-UP**. (4) Select **9. COR-LO**. (5) Set the initial setting value of **9. COR-LO**. (6) Adjust **8. COR-UP** and **9. COR-LO** so that the vertical lines at the four corners on the screen are straight. **- NTSC CORNER PIN -** (1) Receive a NTSC crosshatch signal. (2) Make similar adjustment of NTSC CORNER in the same way as for "PAL CORNER". (3) Press the [DISPLAY] key twice to return to the normal screen.
				

■ **VIDEO - 2 SET: COMPONENT**

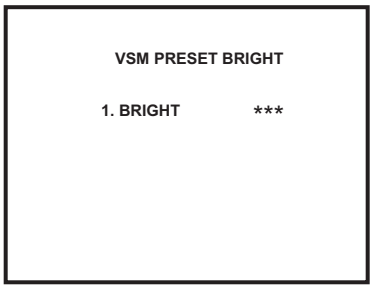
Item	Measuring instrument	Test point	Adjustment part	Description
H. POSITION adjustment	Signal generator Remote control unit		[4. DEF] 4. H-CENT	(1) Receive a PAL circle pattern signal to VIDEO-2 component terminal. (2) Select VIDEO-2 SET from the MENU and set VIDEO-2 SET to COMPONENT. (3) Select **4. DEF** from the SERVICE MENU. (4) Select **4. H-CENT**. (5) Set the initial setting value of **4. H-CENT**. (6) Adjust **4. H-CENT** to make "**C=D**". (7) Press the [DISPLAY] key twice to return to the normal screen.



4.7.7 VSM PRESET SETTING

Item	Measuring instrument	Test point	Adjustment part	Description
VSM PRESET setting	Remote control unit		[5. VSM W/B] 1. BRIGHT 2. CONT 3.COLOUR 4. SHARP 5. HUE 1. R-DRIVE 2. G-DRIVE 3. B-DRIVE	(1) Select **5. VSM W/B** from the SERVICE MENU. (2) Select BRIGHT with the MENU [OK] key. (3) Set the value of **1. BRIGHT** ~ **5. HUE** to the values shown in the table. (4) Respectively select the VSM PRESET mode for SOFT and STANDARD. (5) Select COOL with the MENU [OK] key. (6) Set the values of **1. R-DRIVE** ~ **3. B-DRIVE** to the value shown in the table. (7) Select the W/B preset for WARM and NORMAL, respectively. (8) Press the [DISPLAY] key twice to return to the normal screen.

SUB MENU 5. VSM W/B



[Setting Values for SUB 5. VSM W/B]

VSM preset / Setting item	BRIGHT	STANDARD	SOFT
1. BRIGHT	0	0	+2
2. CONT	+15	0	-3
3. COLOUR	0	0	0
4. SHARP	0	0	-10
5. HUE	0	0	0
W/B preset / Setting item	**COOL**	**NORMAL**	**WARM**
1. R-DRIVE	0	+2	+10
2. G-DRIVE	0	0	-4
3. B-DRIVE	0	-10	-12

4.7.8 PURITY AND CONVERGENCE

■ **PURITY ADJUSTMENT**

Note:

The final adjustment of CONVERGENCE must be done after the FOCUS adjustment. (CONVERGENCE is changed by FOCUS adjustment.)
When makes difference by FOCUS adjustment, should be reconfirming PURITY adjustment.

(1) Demagnetize CRT with the demagnetizer.

(2) Loosen the retainer screw of the deflection yoke.

(3) Remove the wedges.

(4) Input a green raster signal from the signal generator, and turn the screen to green raster.

(5) Move the deflection yoke backward.

(6) Bring the long lug of the purity magnets on the short lug and position them horizontally. (Fig.2)

(7) Adjust the gap between two lugs so that the GREEN RASTER will come into the centre of the screen. (Fig.3)

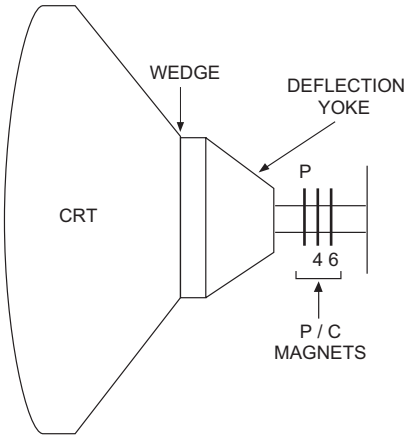
(8) Move the deflection yoke forward, and fix the position of the deflection yoke so that the whole screen will become green.

(9) Insert the wedge to the top side of the deflection yoke so that it will not move.

(10) Input a crosshatch signal.

(11) Verify that the screen is horizontal.

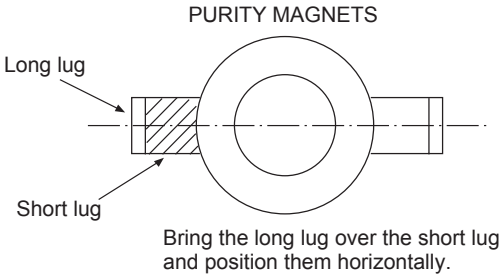
(12) Input red and blue raster signals, and make sure that purity is properly adjusted.



• P/C MAGNETS

P : PURITY MAGNET
4 : 4 POLES (convergence magnets)
6 : 6 POLES (convergence magnets)

Fig.1



Bring the long lug over the short lug and position them horizontally.

Fig.2

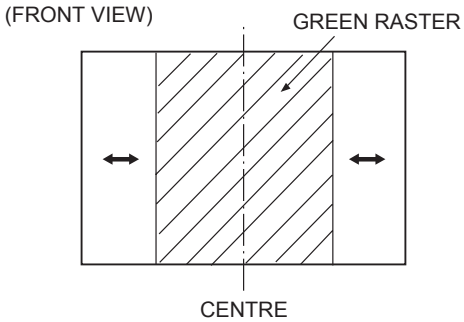


Fig.3

■ STATIC CONVERGENCE ADJUSTMENT

(1) Input a crosshatch signal.

(2) Using 4-pole convergence magnets, overlap the red and blue lines in the centre of the screen (Fig.1) and turn them to magenta (red/blue).

(3) Using 6-pole convergence magnets, overlap the magenta (red/blue) and green lines in the centre of the screen and turn them to white.

(4) Repeat 2 and 3 above, and make best convergence.

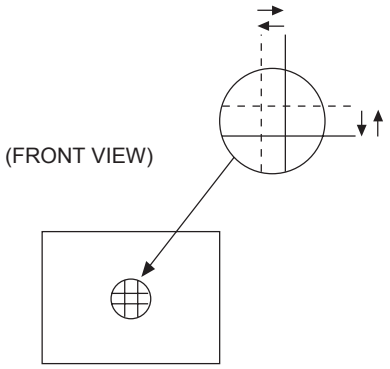


Fig.1

■ DYNAMIC CONVERGENCE ADJUSTMENT

(1) Move the deflection yoke up and down and overlap the lines in the periphery. (Fig. 2)

(2) Move the deflection yoke left to right and overlap the lines in the periphery. (Fig. 3)

(3) Repeat 1 and 2 above, and make best convergence.

(4) Adjust XV by XV coil. (Fig.4)

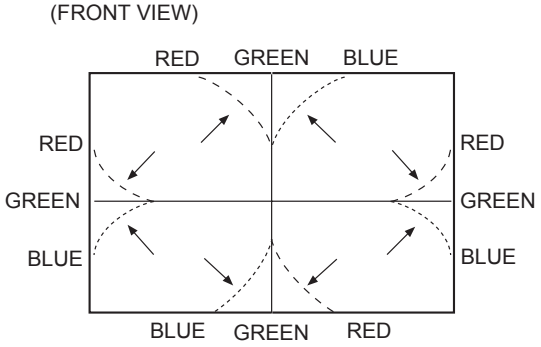


Fig.2

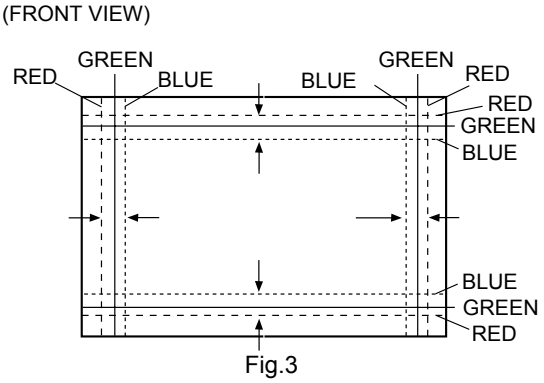


Fig.3

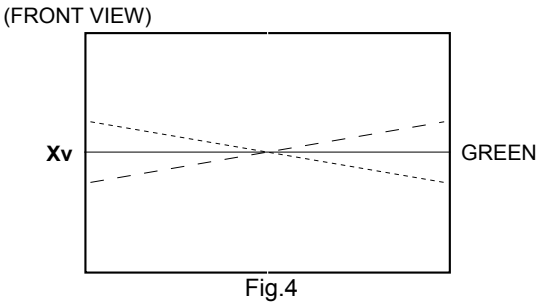


Fig.4

- After adjustment, fix the wedge at the original position. Fasten the retainer screw of the deflection yoke. Fix the P/C magnets with glue.

SECTION 5
TROUBLESHOOTING

5.1 SELF CHECK FUNCTIONS

5.1.1 OUTLINE

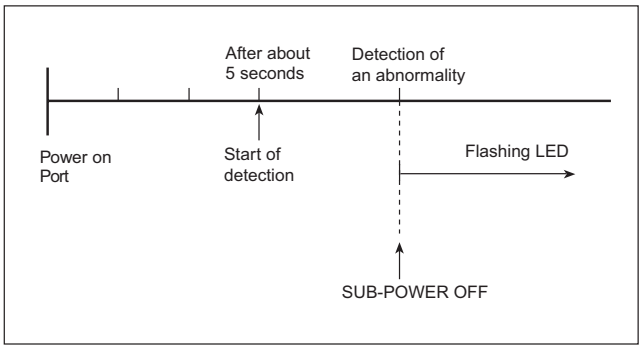
This model has self check functions given below. When an abnormality has been detected, the SUB POWER is turned off and POWER LED flashes to inform of the failure. An abnormality is detected by the signal input state of the control line connected to the microcomputer.

5.1.2 SELF CHECK ITEMS

Check item	Details of detection	Method of detection	State of abnormality
B1 over-current protection	An over-current on the low B1 line is detected.	The main microcomputer detects the possible abnormality at 24-msec. intervals and judges the results in every 16 time. Of the 16 times, if NG is detected more than 9 times, it is judged that there is an abnormality.	When an abnormality has been detected, the SUB-POWER is turned off. While the SUB-POWER is being turned off, the POWER key on the remote control unit is not operational until the power cord is disconnected and connected again.
CRT neck broken protection	Operation of CRT neck protection circuit.		

5.1.3 SELF CHECK INDICATING FUNCTION

When an abnormality has been detected at about 5 seconds after the power was turned on, the SUB POWER is turned off immediately and the POWER LED flashes.



[INDICATION BY THE POWER LED]

Item	LED flashing intervals
B1 over-current protection / CRT neck broken protection	0.3 seconds

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